

CLAIMS

What is claimed is:

1. A method for removing copper from ferrous scrap, comprising:  
providing a ferrous scrap containing copper;  
oxidizing the copper in the ferrous scrap at a rate higher than the oxidation rate of the remainder of the scrap; and  
impacting the oxidized scrap.
2. The method of claim 1, further comprising fluxing the oxidized scrap after it is impacted.
3. The method of claim 2, further comprising separating a copper-containing slag portion from the steel portion created by the fluxing process.
4. The method of claim 1, wherein the oxidation is performed for about 400 to about 900°C.
5. The method of claim 4, wherein the oxidation is performed at a temperature ranging from about 400 to about 700°C and for a time ranging from about 4 to about 6 hours.
6. The method of claim 1, wherein the impacting is performed by tapping or shaking.
7. The method of claim 2, wherein the fluxing is performed using either Na<sub>2</sub>O-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-based slags or a modified electric arc furnace slags based on CaO-SiO<sub>2</sub>-B<sub>2</sub>O<sub>3</sub> at temperatures below the melting point of steel.
8. The method of claim 7, wherein the melting point of the EAF slag is lowered by mixing an additive with the oxidized slag.
9. The method of claim 9, wherein the additive comprises B<sub>2</sub>O<sub>3</sub>, CaF<sub>2</sub>, Na<sub>2</sub>O or combinations thereof
10. The method of claim 10, wherein the amount of the additives can range up to about 30 wt%.
11. The method of claim 11, wherein the amount of the additives can range from about 5 to about 15 wt%.
12. The method of claim 3, wherein the separation is performed by a metallurgical process.
13. The method of claim 2, wherein the fluxing process both creates an upper portion containing copper and a lower portion containing steel and then removed the upper portion by sloughing.
14. A method for removing copper from ferrous scrap, comprising:

providing a ferrous scrap containing copper;  
oxidizing the copper in the ferrous scrap at a rate higher than the oxidation rate of the remainder of the scrap;

impacting the oxidized scrap;

fluxing the oxidized scrap after it is impacted.

15. A system for removing copper from ferrous scrap, comprising:  
means for providing a ferrous scrap containing copper;  
means for oxidizing the copper in the ferrous scrap at a rate higher than the oxidation rate of the remainder of the scrap; and  
means for impacting the oxidized scrap.

16. The system of claim 15, further comprising means for fluxing the scrap after it is impacted.

17. A purified ferrous scrap made by the method comprising:  
providing a ferrous scrap containing copper;  
oxidizing the copper in the ferrous scrap at a rate higher than the oxidation rate of the remainder of the scrap; and  
impacting the oxidized scrap.

18. The purified ferrous scrap of claim 17, further comprising fluxing the oxidized scrap after it is impacted.

19. A partially-purified ferrous scrap containing copper in the form of copper oxide.

20. A purified ferrous scrap containing less than about 0.5 wt% copper.

21. The purified ferrous scrap of claim 20, wherein the scrap contains less than about 0.1 wt% copper.

22. The purified ferrous scrap of claim 21, wherein the scrap contains less than about 0.05 wt% copper.

23. A method for removing copper from ferrous scrap, comprising:  
providing a ferrous scrap containing copper;  
converting the ferrous scrap to a partially-purified scrap; and  
converting the partially-purified scrap into purified steel by removing about 90 to less than 100 wt% of the total copper.

24. The method of claim 23, further comprising removing from about 99.5 to about 99.9 wt% of the total copper.

25. A method for removing copper from ferrous scrap, comprising:  
providing a ferrous scrap containing copper;

converting the copper in the ferrous scrap to a copper oxide; and  
dissolving the copper oxide into a molten slag by removing about 90 to less than 100 wt% of the copper in the scrap.

26. The method of claim 25, further comprising removing from about 99.5 to about 99.9 wt% of the total copper.